NEW YORK STATE OF OPPORTUNITY. Department of Transportation

A Framework for Active Transportation and Demand Management in New York State

The Implementation Plan

September 1, 2016

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Prepared for

New York State Department of Transportation
50 Wolf Road
Albany, NY 12232

Prepared by

ICF International
9300 Lee Highway
Fairfax, VA 22031

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Introduction

New York State Department of Transportation (NYSDOT), in collaboration with its agency partners, has developed a framework for Active Transportation and Demand Management (ATDM). This framework describes a vision for managing a safe, multimodal, and reliable transportation system. Under this vision, transportation is seen as a shared responsibility between state, local, and regional transportation agencies. Together these agencies seek to be responsive to traveler demands for better reliability, safety, and choices in their travel experience. A number of challenges face these agencies, including constrained finances, limited capacity, and changing demographics. Solving these problems requires a strategic and integrated approach that builds synergies between agency capabilities and initiatives.

Figure 1. Stakeholder outreach and workshops informed the development of the ATDM framework and the implementation plan

This document, the ATDM Implementation Plan, provides a list of strategies and recommendations for NYSDOT and its agency partners to consider in the near-term to advance components of the ATDM framework. As illustrated in Figure 1, this document builds on the findings from three stakeholder workshops and outreach activities conducted in the summer of 2014 and the resulting ATDM framework developed in 2015.

This implementation plan is built upon the premise that active collaboration can lead to developing more reliable door-to-door travel through dynamic management of facilities and more effective communication with travelers. Most corridors involve operational responsibilities provided by multiple service providers or agencies. As such, developing efficiencies and improvements will depend on the close operational coordination across multiple agencies. ATDM offers an opportunity to leverage resources across agencies to solve operational problems and challenges.

1.1 Implementation Approach

This implementation plan identifies actions that NYSDOT can take in coordination and/or in cooperation with agency partners to advance the objectives and vision of the ATDM Framework document. Over the next five years, NYSDOT will work cooperatively to pursue the strategies identified in this plan and others.

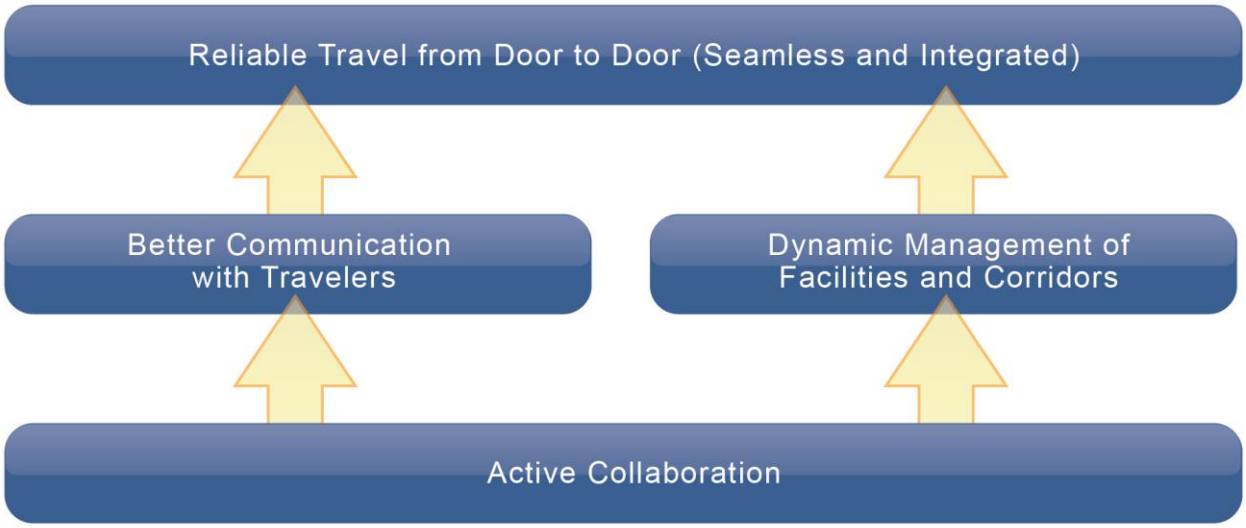
The following principles are used to develop the actions identified in the implementation plan (Figure 2):

- **Realistic and financially prudent:** ATDM does not involve capital-intensive projects and large operating costs. Many of the actions identified in the plan can be pursued now and do not require significant investments in technology or infrastructure.
- **Innovative:** By bridging active traffic management (ATM), active demand management (ADM), and parking management along with information technology, the ATDM program provides new tools to the transportation managers, such as dynamic merge applications and priority treatments to alleviate traffic bottlenecks, dynamic ride matching support, and park and ride lot information integration, all targeted toward multimodal management of corridors.
- **Flexible:** ATDM addresses a broad range of contexts throughout New York – from complex urban congested corridors such as the Long Island Expressway, to corridors in more rural areas facing seasonal congestion, such as travel routes to Lake Placid. Likewise, ATDM is not just for recurring congestion; it can be applied to construction projects, special events, weather emergencies, and other situations that disrupt multimodal travel options.
- **Incremental improvements that build on existing initiatives:** Building incrementally through focused real-world deployments in different contexts and showing early benefits of ATDM is critical. This approach does not need to involve "reinventing the wheel." Actions build on a foundation of existing resources, programs, and services, such as the "Drivers First" initiative focused on construction management, on-going activities at the TMCs, and 511NY Rideshare services.
- **Performance-driven:** Through a robust measurement and evaluation framework, approaches and actions are continually assessed and refined.

Figure 2. ATDM Implementation Principles

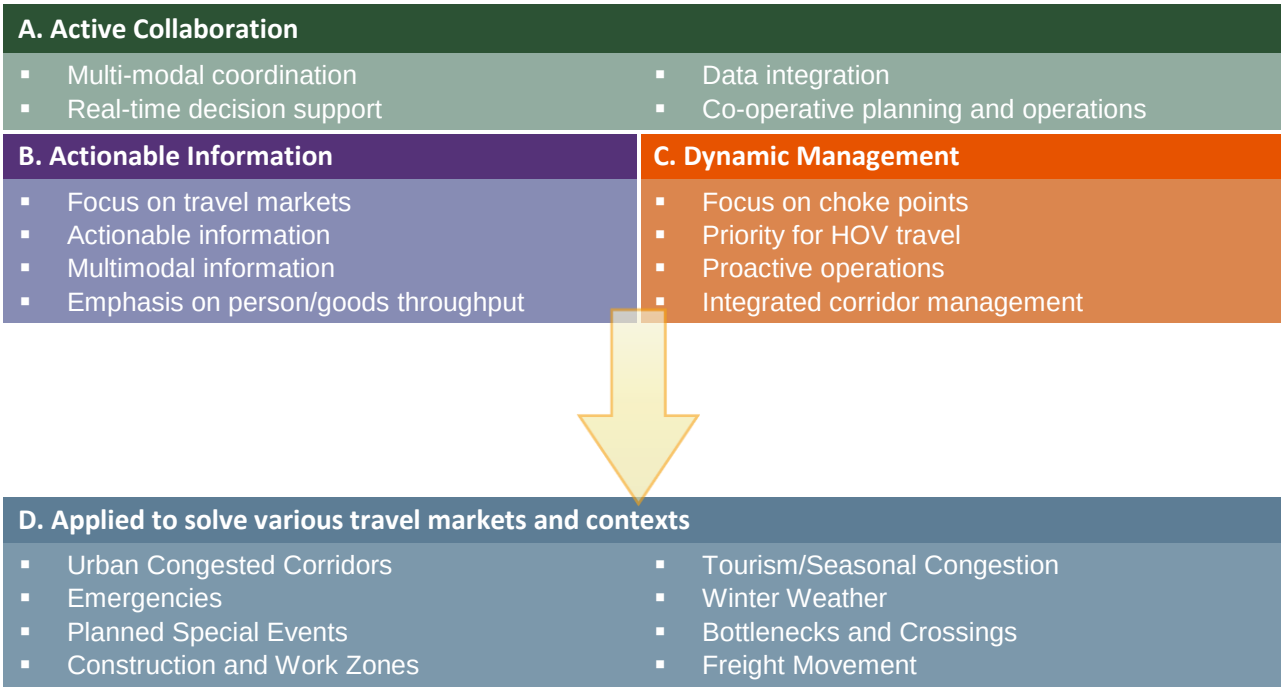
The ATDM Vision is **"working together for reliable travel from door to door"** – achieved through operational collaboration that enables better communication with travelers and dynamic management of facilities and corridors (Figure 3).

Figure 3. The ATDM Vision



Four critical components are proposed that will form the backbone of the state's ATDM framework to realize this vision: a) new models of active collaboration, b) a focus on actionable multimodal information, c) dynamic management, and d) application in various travel markets and contexts (Figure 4).

Figure 4. The Statewide ATDM Framework



Together, aspects of implementation are geared toward providing the following capabilities:

- Real-time information being used to improve dynamic responsiveness to traffic congestion, incidents, weather conditions, and emergencies. NYSDOT and its agency partners – bridge/tunnel authorities, transit agencies, metropolitan planning organizations (MPOs), and local governments – can use real-time travel information to more effectively manage planned construction, special events, and other significant travel-impacting events.
- Travelers being empowered with real-time information on traffic congestion, travel delays, and travel options – including transit, ridesharing, and bicycling – to make smart travel choices both before starting a trip and while en-route.
- Effective partnerships with public and private partners to leverage mutual capabilities. Related demand management initiatives such as the New York City Department of Transportation (NYC DOT) community-based marketing program and the myriad travel management services offered by major universities and employers offer an opportunity to enhance the impact of the 511NY Rideshare program.
- Adoption of new technologies and approaches to incentivize travel behaviors that reduce and distribute travel demand across multimodal networks, including freeways, arterials, and transit services.
- Implemented innovative dynamic management of transportation facilities (highway, arterial streets, parking, tolled and intermodal facilities) to optimize system operations in terms of improved mobility and safety, supporting enhancement of person and freight operator trip reliability through heavily congested corridors/segments. The FHWA I-495 Integrated Corridor Management (ICM) Corridor would be an example of a heavily congested corridor that would benefit from dynamic management of transportation facilities based on improving person trip reliability.
- A high degree of readiness and capability to leverage emerging technology advancements such as connected vehicles effectively for transportation systems management and operations. Through active collaboration, the value of future investments in connected vehicle technology can maximized through greater inter-operability and information sharing.

1.2 Document Overview

The implementation plan is an early compilation of ideas and approaches that emerged from the workshops and interviews conducted as part of the ATDM framework development. The list of ideas is organized by “implementation areas” and is a starting point for ATDM; it is not intended to be prescriptive or all-inclusive. As the discussion around ATDM evolves along with the state of the practice, new concepts may emerge and take priority under each implementation area. The document is organized as follows:

- Actions and strategies to strengthen the existing operational collaboration models in the State today.
- Real-world pilots and deployment scenarios that further seamless and reliable travel through application of ATDM strategies and techniques.
- Monitoring and evaluation actions to support continually improving the ATDM framework.
- Institutional actions necessary to spur the adoption of ATDM.

Strengthening Active Collaboration for ATDM

Learning from the successes of the regional collaborative partnerships, such as Niagara International Transportation Technology Coalition (NITTEC) and Transportation Operations Coordinating Committee (TRANSCOM), as well as more operational partnerships that exist in the State, the deployment of effective ATDM strategies involves strengthening existing partnerships and maturing the capability of relationships both within an agency as well as between agencies. Multiagency partnerships like NYC DOT/Metropolitan Transportation Authority (MTA) Select Bus Service (SBS) implementation, management of ICM Corridor projects in the New York/New Jersey I-495 Corridor and the I-190 Corridor connecting Buffalo and Canada, the partnerships supported by the 511NY Rideshare program, and the region's recent experiences in large-scale construction management and emergency management offer examples for how to bring together disparate agencies and groups to focus on system performance outcomes.

Active collaboration requires bridging of diverse functions, including operations, maintenance, planning, design, construction, and safety of different facilities and modes. This involves breaking down silos so that engineers, planners, operators, and other specialists work together to advance development and implementation of investments, protocols, and procedures that support seamless traveler information and improved system operations.

Many of the actions described below can be pursued now and do not require significant investments in technology or infrastructure. Nor are they tied to a project implementation. By building these relationships and collaboration models, the ability to deliver on multi-jurisdictional and multimodal operations increases greatly in the State. Without these actions, the ability to implement complicated operational strategies like ICM or ATM will be compromised. Three implementation areas are identified in this plan to highlight how NYSDOT and partners can identify opportunities for operational collaboration:

- Operational integration between transportation management centers, operational and control systems
- Expanding existing operational partnerships
- Bringing new partners to systems management

Implementation Area 2.1. Operational integration between transportation management centers, operational and control systems

Transportation Management Centers (TMCs), be it for traffic or transit, are the nerve centers for coordinating systems management and operations. These centers provide situational awareness of regional transportation systems and play a vital role in the lives of travelers throughout the state by providing real-time traveler information, managing incidents and events on the network, and coordinating response during emergencies. Providing a dynamic linkage between TMCs and operators of multimodal transportation (transit/goods movement) and managers of

toll facilities and traffic (highway/arterial control) control systems would support optimization of transportation systems at sub corridor, corridor, and network levels. An example of an integrated ATDM strategy would be dynamic ramp metering with the ability to prioritize bus access, interconnected with the adaptive traffic signal system serving the arterial network within the impacted transportation corridor.

Today, there are opportunities for improved real-time travel information with Statewide Advanced Traffic Management System (ATMS) and integrating technology systems across the state. The Drivers First Initiative has made a difference in the TMC operations already. TMCs have become more data-driven in an effort to reduce impacts of work zones, and have begun to take a more proactive approach to work zone congestion. The level to which TMCs coordinate across regions varies throughout the state but there is a desire to coordinate more with other TMCs in an effort to learn from peers and to leverage resources and information. This could be particularly useful for new concepts, such as ATDM. One TMC suggested that additional investments in communications would foster better information sharing across the TMCs and other agencies. Many of the TMCs have participated at one point in multi-agency work groups that support cross-agency coordination. Even in instances where committees no longer meet, the TMCs indicated that the relationships have endured. Although there is currently limited coordination, even in areas where positive relationships exist between the transit agencies and the TMCs, there is potential to better link transit information with the TMC's operations. The following table provides an initial list of actions (starting with the low-cost, less complex) to strengthen the linkages and coordination between the traffic and transit management centers within the State.

Table 1. Potential Implementation Actions in the Area

☐ Conduct annual facilitated table-top exercises between operators to update system operations "playbooks"
☐ Continue support of standardization of traffic and transit data feeds and dynamic sharing of data in support of integrated corridor management systems
☐ Develop consensus on incident reporting formats (start time, location notification)
☐ Build on current playbooks around responses to adverse weather, emergency response and construction management to include a robust consideration of demand management strategies
☐ Support regional peer exchanges and operator-led knowledge transfer events
☐ Establish a corridor level ATDM interagency working group to identify near term dynamic management treatments which can be implemented in the near term either as standalone projects or added to existing projects

Implementation Area 2.2. Expanding operational partnerships for systems management

Along any given corridor, there are many agencies and stakeholders involved – this may include cities and counties, transit agencies, departments of transportation, emergency first responders, etc. Successful implementation of ATDM strategies often depends on strong partnerships among these agencies and stakeholders. This partnership can take many forms, from a small group of partners that meet regularly to a more advanced collaboration that is its own entity (e.g., NITTEC).

Such partnerships go beyond the commute. From emergency management to planned special events to construction management, effective partnerships that improve situational awareness and response of individual agencies and collective responses as a region are critical. For example, construction management is an area where no single agency can be singularly responsible for maintaining safety and mobility. Effective information sharing especially in real time, communication, and coordination are critical to creating and sustaining ATDM partnerships. The agencies and stakeholders involved may have different ways of handling issues and making decisions, so having clear protocols that describe the roles and responsibilities and communication procedures are important for effective collaboration. The following table provides a list of actions (starting with the low-cost, less complex) to strengthen the operational partnerships that exist today with a focus on improving corridor operations and construction management.

Table 2. Potential Implementation Actions in the Area

☐ Develop Integrated Corridor Management Plans or Concepts of Operation for key corridors in the State with a focus on developing joint objectives around operations
☐ Develop a construction hot-spot and watch-list map on a periodic basis, compiling information across various construction schedules
☐ Develop a multi-agency construction impact analysis (CIA) tool
☐ Expand use of an existing information exchange portal (like the current Integrated Incident Management System – IIMS) that supports rapid peer to peer and broad-based distribution of response status from center to center and center to field
☐ Support a multi-agency data fusion and decision-support tool that provides the capability to compile regional information and analyze current conditions in a region
☐ Conduct a technology readiness and capability assessment that defines how current and future technology trends (connected vehicle technology, shared-use models, automated vehicles) may impact ATDM and systems management

Implementation Area 2.3. Bringing new partners for systems management

To support the vision of a reliable trip from door to door, a broad set of partners are required beyond the traditional operating agencies. For example:

- The private sector, as developers of new mobility and travel information business models, as well as employers who influence how their employees get to work through their own business

practices and protocols (such as telecommuting policies, flexible work schedules, transit passes, and parking policies)

- Parking operators, including the private sector and local governments, to advance smart strategies in relation to parking pricing, preferential parking for carpools and vanpools, appropriate hours and rates for on-street versus off-street parking, informal or formal park-and-ride arrangements to support transit and ridesharing, and other strategies
- The freight community, including shippers, carriers, and receivers, to advance strategies to better manage goods movement across all modes in ways that reduce congestion, improve reliability, and enhance regional economic competitiveness
- Local agencies and employment hubs that play an important role in travel demand and operations, such as hospitals, airports, ports, and school districts, which encompass large bus fleets and move hundreds of thousands of children each day
- Other state agencies and their partners, such as agencies responsible for housing, economic development, and health services, to support mobility needs for populations with unique travel needs and constraints, including low-income populations, veterans, the disabled, and aging populations

The following table provides a list of actions (starting with the low-cost, less complex) to bring new partners to managing the transportation system in New York.

Table 3. Potential Implementation Actions in the Area

☐ Engage local government on highway construction projects more actively and early in the process
☐ Establish working groups with transit operators to identify problem areas which impact trip reliability for scheduled services and opportunities for application of ATDM tools which would improve person trip reliability
☐ Develop a list of high-priority employers in key corridors that require continuity of operations capabilities and provide technical assistance in developing continuity of operations plans
☐ Conduct outreach, as done with Prospect Mountain, during construction projects to ensure that businesses are aware of alternate travel routes to share with customers
☐ Seek out sponsorship or support from private sector businesses for incentives that would support sustainable transportation options and programs
☐ Engage with the private sector to understand new ways of crowd sourcing information on travel conditions
☐ Identify a dedicated freight coordinator(s) that will focus on developing operational partnerships with the freight industry
☐ Leverage public partner interest and funding capabilities to support demand management activities that promote sustainability and energy efficient transportation

Demonstrating Value of ATDM through Deployment

With expanded operational partnerships, there are a number of innovative strategies to pursue for ATDM. Through customized, actionable information and more dynamic management, NYSDOT can provide more choices to travelers on more optimized facilities through real-world deployments. As noted previously, ATDM deployments are incremental and take advantage of the existing programs and practices. Building on a robust Intelligent Transportation System (ITS) system, approaches in this area support preparing for and responding in real-time to changing travel conditions. Across a state as diverse as New York, not every region or situation will require the same approach to technology, data sharing, and partnering. Many of the actions listed in this section require customization based on the travel context. For example, a city like Buffalo has needs related to parking, freight and international border crossings. Responding to events in the ultra-populated New York City metro area will involve an array of modal options, partners, and strategies that are different from those needed in a rural area with a different system of road and transit options.

Implementation Area 3.1. Providing customized travel options and choices

Providing actionable, seamless information can expand options for travelers on a corridor. More choices can be provided through predictive and comparative travel time, enhanced ride matching services, and other multimodal trip supports. The promise of predictive, multi-modal, multi-jurisdiction traveler information is tantalizingly near. NYSDOT and partners are well positioned to take advantage of the new business models and technologies that are sprouting rapidly. Activities in this area primarily focus on improving existing services by adding a multimodal focus as well as active or dynamic elements. The following table provides a list of actions (starting with the low-cost, less complex) to support providing customized travel options and choices.

Table 4. Potential Implementation Actions in the Area

☐ More comparative travel time information into the 511NY system, such as car, HOV, bus, train, etc. When possible, bike or walk options, including locations of bike share, should also be included.
☐ Add predictive travel time on key facilities and corridors
☐ Integrating park and ride lot availability and locations into 511NY
☐ Develop a dynamic ridesharing concept that adds new capabilities to the existing ride matching system
☐ Explore incentives, games and other approaches to create positive travel behavior changes as part of overall demand management
☐ Work with the private sector to support route guidance using in-vehicle technology
☐ Incorporate private sector options into guaranteed ride home programs
☐ Develop mobility hubs around transit intermodal facilities that bring together travel options
☐ Develop priority transit treatments which provide for dynamic routing by HOVs/buses through congested corridors (highways/arterial streets and bottleneck locations)
☐ Integrate customer information between modal agencies to provide one-stop or seamless voice communications with travelers

Implementation Area 3.2. Supporting effective freight movement

Goods movement and freight are crucial to the economic competitiveness for the State of New York. Cross-border freight continues to grow and use the infrastructure in New York State. Traditionally, freight movement has not been seen as a priority for traffic management, nor is it always well incorporated into corridor management plans or construction mitigation plans.

To consider freight within an ATDM approach requires first recognition of freight's differences from passenger traffic. Freight movement is typically multi-jurisdictional, interregional, and affected by global economic factors. Second, freight involves a different set of stakeholders. Finally, freight has unique issues and constraints (hours of service rules, turning radius, restricted routes) that need to be considered if looking at dynamically shifting traffic. In urban areas in particular, there is a need to consider potential conflicts between needs for truck loading/unloading, street parking, bicycle lanes, and transit. New York State's recognition of freight as a crucial issue statewide has led to the development of key strategies and plans such as the Port Authority of NYNJ Goods Movement Action Plan (GMAP). ATDM offers another opportunity to meaningfully engage in a partnership with the freight community. The following table provides a list of actions (starting with the low-cost, less complex) to support effective freight movement through the ATDM program in New York.

Table 5. Potential Implementation Actions in the Area

☐ Create a Statewide Freight Web Portal. A freight web portal focused on the needs of truckers would provide targeted information designed around the needs of the freight community.
☐ Develop a road and traffic condition reporting application for truckers. Technology can allow truckers to report road conditions or problems straight to DOT
☐ Create a statewide freight coordinator role, and increase partnerships with the freight industry, including shippers and carriers
☐ Create freight-emphasis corridors to focus on specific improvements to freight. Selected corridors can include truck facility improvements, travel time messaging, border wait times, incentives to shift times and routes
☐ Develop and pilot strategies for the last-mile of freight, including several operational options to reduce the number of vehicles in circulation, number of supply trips, mileage and transport related air pollutant emissions, and noise

Implementation Area 3.3. Increasing high occupancy vehicle (HOV) use

ATDM increases the emphasis on managing demand – and one of the core elements of demand management is mode choice. Enabling travelers to shift from single-occupancy vehicles (SOV) to higher-occupancy modes is one of the core objectives of the 511NY Rideshare program. In addition to support of the existing TDM service delivery, activities in this area provide a greater emphasis on priority treatments for HOVs as well as multimodal travel support. The following table provides a list of actions (starting with the low-cost, less complex) to support increased use of HOV through the ATDM program in New York.

Table 6. Potential Implementation Actions in the Area

☐ Support HOV 3+ Formation using 511NY
☐ Showcase information and schedule information for new or premium transit services (BRT/SBS) prominently on 511NY
☐ Integrate real-time transit information on 511 NY and provide next bus arrival information on key decision-points
☐ Investigate preferential treatment lanes/shoulders for HOV 3+ especially around key bottlenecks such as queue jumping
☐ Evaluate toll discounts/credits for verified HOV 3+ users
☐ Provide transit priority treatment at key bottlenecks (highway/ arterial street - intersections and interchanges) including transit signal priority queue jumper lanes in ICM corridors (for example, Woodhaven Blvd/Queens Blvd and LIE interchange)

Implementation Area 3.4. Dynamic management

Dynamic management for ATDM builds off the existing ITS infrastructure. Moving forward in this area involves maximizing the potential of existing technologies available on the roadside and includes consideration of the following approaches:

- Consistent with the vision to emphasize improving person trip reliability and person throughput, dynamic management can help support priority treatments for high-occupancy vehicles through a combination of priority lane/shoulder-use, merge control, dynamic ramp management ITS and striping. Comparatively low-cost relative to capacity expansion, these measures provide access and greater reliability for transit and HOV users
- Through an ICM program, support greater balancing of the load with priority for multi-occupant vehicles between available parallel routes and modes especially during incidents, adverse weather or work zones. Proven strategies like responsive ramp metering integrated with arterial adaptive traffic signal systems support route diversions along congested corridors
- Expand incident management capabilities statewide to support reliable travel. These include increasing the coverage of safety service patrols, standardization of incident reporting between agencies, enhancing capability of reporting conditions at the incident scene with multiple incident responders, traffic managers, and operation centers from the pre-staging resources around known hot spots
- Where warranted, develop dynamic speed/queue warning and lane management approaches to better match speed and lane availability to traffic conditions. Starting with locations with known safety and congestion issues, speed and lane management can be used to support work zone management, complex merges and bottlenecks/crossings

In general, these approaches move NYSDOT and partners to a more proactive posture in operations. Not all the approaches identified in this area will be applicable in all contexts or locations. Closely tied to the implementation of all these ideas are the tools for data fusion with a corridor

and network level and decision-support identified in the operational collaboration section. These tools allow agencies to develop an enhanced situational awareness of conditions on not only their facilities but also their partners. The following table provides a list of actions (starting with the low-cost, less complex) to support demand management through the ATDM program in New York.

Table 7. Potential Implementation Actions in the Area

☐ Expand coverage of Highway Emergency Local Patrol (HELP) to off-peak hours and weekends especially around highway construction and planned special events
☐ Pre-stage HELP resources based on weather forecasts for support during adverse weather
☐ Broaden use of statewide improved incident detection and verification based on reporting incidents through mobile devices such as smart phones and pads interconnected with traffic managers/incident responders via workstations, laptops and mobile devices, etc. within the web environment
☐ Support integration of dynamic ramp metering and arterial adaptive signal timing on service/access roads with emphasis of priority treatment for multi-occupant vehicles
☐ Investigate the feasibility of queue warning and variable speed warning/and or limits in response to observed conditions such as incidents, work zones
☐ Investigate and pilot dynamic merge applications using lane/shoulder control signs that move traffic from rightmost lanes to the middle lanes upstream of ramps with heavy traffic (M)
☐ Dynamic use of shoulder lanes (highway/arterial streets) including access lanes and ramps by general traffic and/or HOV's/buses during periods/sub periods of peak congestion
☐ Implement congestion-based speed limits on select facilities especially on segments that lead to chokepoints like tunnels, bridges
☐ Explore potential of reversible lanes operations where feasible to support additional capacity or during emergencies to support evacuations

Implementation Area 3.5. Enhancing construction management

Construction projects offer a key opportunity to address customer travel needs across all parts of the state – in large, medium, and small urban areas and rural areas. Construction (largely re-construction, but also some routine construction activities) affords the ability to change operating characteristics and adopt mitigation strategies in the short-run that could contribute to more permanent behavioral changes in the longer run. For example, special vanpool subsidies, reduced rail fares, or special bus services might induce a traveler to try a new mode and evidence shows that many will continue after the inconvenience of the construction effort is concluded. Even on smaller construction projects, actionable information can be provided to travelers using a range of approaches to help guide them effectively around or through the work zone with minimal delay, to adjust their times of travel, or to utilize transit or other options. Activities in this area build on the existing best practices through Drivers First and Maintenance and Protection of Traffic plans. The following table provides a list of actions (starting with the low-cost, less complex) to support enhancements in construction management through the ATDM program in New York.

Table 8. Potential Implementation Actions in the Area

☐ Provide additional guidance and support to Drivers First coordinators for market segmentation and development of advance warnings. Developing a simple guide or template on how to perform a market assessment for a construction project, to support the Drivers First initiative, and/or for use with special events
☐ Develop trip reduction and congestion mitigation strategies for specific markets as part of construction
☐ Use graphical tools to illustrate nature of work zones and construction progress
☐ Use web-based and individualized marketing for work zone mitigation
☐ Expand use of work zone ITS to support on-site advisories and alerts including speed management
☐ Develop capability to report conditions in work zones in real time to TMC's which might lead to impacting traffic flows unless mitigated
☐ Evolving role of the Surface Transportation Controller (STCs) position at the state's TMCs to provide more responsive support for work zones
☐ Evaluate the use of ATDM strategies to more effectively protect work zones and mitigate the impact of construction projects on traffic flow
☐ Use work zone ITS for end-of-queue calculation and delay estimates
☐ Provide detour and diversion information based on real-time data around work zones
☐ Develop/deploy statewide tools to support construction impact estimation, similar to one used by Washington DOT

Implementation Area 3.6. Managing weather events and other emergencies

ATDM's role during weather events and emergencies is to help with the management of the multiple and cascading points of failure effectively and provide resilient operations. Depending on the type of emergency, the time to prepare, respond, and recover can vary greatly. ATDM approaches offer NYSDOT and partners a high degree of flexibility in how the system is managed by increasing the integration of systems and responses between agencies and by managing both the reduced supply and the chaotic demand patterns that occur during these times. Building from experience and expertise in information sharing, incident command and emergency operations, activities in this area lead to responsive management of weather events and emergencies. The following table provides a list of actions (starting with the low-cost, less complex) to support effective emergency management through the ATDM program in New York.

Table 9. Potential Implementation Actions in the Area

☐ Integrate National Weather Service alerts and advisories into TMC ATMS
☐ Post weather advisories and road weather warnings on dynamic message signs (DMS) based on weather forecasts
☐ Implement a weather responsive variable speed limit strategy in locations with a history of spot-specific weather concerns
☐ Provide targeted commute support to enable continuity of operations at key employers (like hospitals, airports) during emergencies

Monitoring and Evaluation of ATDM

Performance monitoring and management is inherent in the ATDM approach. ATDM includes selecting appropriate metrics, assessing system performance, evaluating alternatives, and implementing responses to enhance transportation system performance for travelers. Consequently, performance measurement and evaluation occurs at various scales – from real-time assessments to support immediate operations to longer-term (quarterly, yearly) assessments to support development of enhanced policies and collaborative approaches. Advancing ATDM implementation should include the following activities.

Implementation Area 4.1. Improve system monitoring and data for decision-making

Real-time, dynamic system management rests on quality regional, multimodal (car, bus, truck, and bicycle) and multi-jurisdictional data. Such data is needed not only to actively manage the system with real-time data, but also to model future traffic and travel conditions to feed predictive travel information. ATDM requires an ability to use distributed systems and tools to flexibly and efficiently define, optimize, and integrate data between different agencies and authorities – including real-time traffic, transit, and goods movement information – to support operational decisions and to provide information to the public.

With the promise of connected vehicles near and with the tools available to the connected traveler, new datasets are becoming available to use in day-to-day operations. However, translating the data into actionable intelligence, developing appropriate visualization techniques and understanding the limitations of the data is still an emerging field. Through actions in this area, NYSDOT and its agency partners will look toward exploring how the connected vehicle technology can be used to support multimodal and multi-agency decision-making. The following table provides a list of actions (starting with the low-cost, less complex) to improve system monitoring and data management through the ATDM program in New York.

Table 10. Potential Implementation Actions in the Area

☐ Leverage TRANSCOM's new Data Fusion Engine and the I-95 Corridor Coalition activities, as well as NITTEC's efforts to develop analysis and visualization capabilities for ATDM for both off-line and real-time decision-making
☐ Explore new data collection strategies and technologies especially "mining" of GPS based data from in-vehicle navigation systems, V2V or V2I connected vehicle data sources, or monitoring of travel via mobile phone users who opt in to track travel behavior in a real-time setting

Implementation Area 4.2. Enhance ongoing program assessment

NYSDOT and its partners need to be able to assess the impacts of implemented strategies and to communicate the effects on corridor and system-wide performance. Key metrics may include fatalities and injuries, mode shares, and hours of delay, with other metrics defined based on the specific goals and objectives. Performance measurement is critical to ATDM deployment in order to quantify the benefits and to adapt strategy implementation over time. Measuring the impact of an individual transportation project is often difficult, and this is compounded for ATDM deployments, which encompass a range of strategies that may include traffic management, demand management, and parking management. Overall, performance measures are needed that focus on travelers, rather than vehicles. From a traveler or a decision-maker point of view, there are several key measures of interest – safety, mobility, reliability, sustainability, and customer satisfaction. Developing a typology of performance measures and a framework for performance measurement addressing ATDM will help to support assessments of benefits at multiple scales. These benefits can be measured both at a localized level (such as a reduction in congestion at individual intersections) as well as at a corridor or region-level (such as overall improvements in travel times or reliability of travel times). By establishing a measurement framework, NYSDOT and stakeholders can more consistently and effectively measure performance and make mid-course corrections as necessary. The following table provides a list of actions (starting with the low-cost, less complex) to support on-going program assessments through the ATDM program in New York.

Table 11. Potential Implementation Actions in the Area

☐ Develop a framework and key performance metrics for assessing ATDM effectiveness including identifying approaches to determine person- and trip-related measures of effectiveness
☐ Establish a process for continuous capability assessment and improvement for ATDM using the SHRP2 Capability Maturity Model

Institutional Procedures and Guidance to Support ATDM

NYSDOT and its partners should incorporate ATDM into their institutional processes and procedures to streamline the program's integration in day-to-day departmental decisions. As such, new planning tools, protocols, design standards, and other project tools may be needed, even when applied to more "routine" projects.

Implementation Area 5.1. Review and adapt organizational and workforce protocols

An important institutional capability for ATDM is a workforce that is aware of the ATDM framework and is empowered to implement the actions identified in this plan. The following table provides activities that are geared toward statewide collaboration and exchange of ideas leading to a staff that are engaged throughout the process of ATDM deployment.

Table 12. Potential Implementation Actions in the Area

☐ Form a NYSDOT Statewide Working Group to Coordinate ATDM Activities across the State
☐ Develop Work Plans for TMCs, Traffic Engineering and Safety and Maintenance groups that identify ways to bring ATDM into day to day processes
☐ Provide Training to Internal and External Stakeholders on ATDM
☐ Prepare a short briefing paper or offer training on key programs such as ICM, TSMO, and ATDM to ensure staff that are involved in project planning, policies, operations, etc., understand the concepts and how they relate to NYSDOT programs, policies and processes

Implementation Area 5.2. Updating planning and project development design guidelines

ATDM needs to be institutionalized into the day-to-day workings of NYSDOT – how it plans, programs, develops and implements projects. As such, new planning tools, protocols, design standards, and other project tools may be needed, even when applied to more "routine" projects. The following table provides activities geared toward incorporating ATDM into NYSDOT's existing planning and programming processes.

Table 13. Potential Implementation Actions in the Area

☐ Update NYSDOT's Design Guide and especially the Mobility Measures section (Chapter 24), the Project Development Manual (PDM Appendix 6) to incorporate ATDM and designing for operations principles
☐ Incorporate ATDM vision in development of maintenance and protection of traffic (MPT) plans
☐ Conduct an assessment of the project selection, prioritization and programming processes to identify specific points in the process where planners and project managers need to consider ATDM

Implementation Area 5.3. Developing ATDM Playbooks for application contexts

The actions identified in the previous sections need to be customized based on the application contexts that have been identified for the state (Table 14). Providing playbooks for how ATDM can be applied in these widely different contexts is the emphasis of this area. Activities in this area relate to providing best practices, highlighting success stories and creating resources that are available Statewide to practitioners.

Table 14. Application Contexts for ATDM

Contexts	Examples
Complex, urban congested corridor	▪ Cross Bronx Expressway, Long Island Expressway, and I-684 Corridor with Parallel Metro-North Rail Line ▪ I-490 corridor in Rochester and I-81 corridor in Syracuse
Urban arterial network	▪ NYC's five boroughs ▪ CBDs in Syracuse, Rochester, Buffalo and Albany
Bottlenecks and crossings (bridges, tunnels and border crossings)	▪ Queens-Midtown Tunnel, Lincoln Tunnel and Holland Tunnel ▪ US-Canada Border Crossing
Seasonal, recurring off-peak congestion	▪ I-87 Expressway in Albany during seasonal tourism ▪ Finger Lakes area during summer tourism season ▪ Lake Placid area during ski season, and Lake George during summer tourism
Major emergencies and weather	▪ Hurricane Sandy evacuations in Downstate metro area ▪ Winter storm preparations in upstate NY ▪ Hurricane Irene flooding
Construction	▪ Maintenance of traffic and support to businesses during periods of reconstruction such as the bridge replacement in Whitney Point in Broome County, I-787 construction in downtown Albany or Twin Bridges in Albany
Special events	▪ UN Assembly in NYC or major sporting event (like NYC Marathon) ▪ Buffalo Bills Football Game or Syracuse NYS Fair ▪ Festivals and special events in Finger Lakes region (such as wine festivals)

The following table provides a list of actions (starting with the low-cost, less complex) to support developing ATDM playbooks through different contexts in New York.

Table 15. Potential Implementation Actions in the Area

☐ Prepare case studies of ATDM deployments with an initial focus on the following – corridor management, emergency management, construction management
☐ Develop playbooks for NYSDOT and partners on ATDM integration into Traffic Incident Management, Travel Demand Management, and Traffic Management. These playbooks provide a structured response plan approach to events by associated stakeholders and highlight the dynamic elements of ATDM

Summary

The adoption of ATDM concepts and ideas rests on buy-in and engagement with the partner agencies. Through existing forums, ongoing initiatives like ICM programs and Drivers First, and new partnerships and pilots, elements of the framework are expected to be conceptualized, evaluated, and deployed in a collaborative manner. The implementation of ATDM begins a new era of operational collaboration within the State of New York, and will continue to evolve as NYSDOT and partners begin realizing elements of their vision of seamless reliable travel. This implementation plan provides an approach for realizing immediate impacts on trip reliability and traveler satisfaction through near-term operational collaboration while providing a flexible roadmap for agency partners to realize a truly seamless, multimodal and reliable transportation system.